Aalto University
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"Since you are so networked, they must pay you more"

Networks and the Finance Wage Premium

Abstract

Existing literature has tried to explain the surging wage premium within the financial industry since the 1980s. A widely proposed explanation, increased number of skilled workers, was proven wrong by Metzker and Bohm in 2015, which started new speculations about the possible explanations for higher relative wages in finance. This study provides previously undocumented evidence about the relationship between executive connectedness and the finance wage premium. I use similar methods as Engleberg, Gao and Parsons (2013) for constructing each executive's connectedness and find that executives in finance receive excess pay for their connections in comparison to other industries. Furthermore, I find that the networks of executives have a positive impact on firm performance in the financial sector but not in other sectors. My sample consists of 29,000 executives of large listed firms in the U.S. for the years 2000-2014. My results are robust for additional tests and controls.

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I. Introduction

Several authors have studied the extraordinary increase of relative pay within financial sector around the world during the last few decades (e.g. Frydman 2007; Kaplan and Rauh, 2010; Philippon and Reshef, 2012 and Metzker and Bohm (2015). One of the prevailing theories studied suggests that financial deregulation in the 1980s increased the complexity of work in finance in relation to other industries boosting the demand for skill within finance (Philippon and Reshef, 2012; Célérier and Vallée, 2015). Moreover, the increasing wages in finance started the discussion of potential "brain drain" into the financial industry in the 1990s since these talented individuals may have been more productive in other activities, such as innovation and development (Baumol, 1990; Murphy, Shleifer and Vishny, 1991). Kneer (2013) further suggested that the financial deregulation and "brain drain" resulted in a reduction in productivity outside of the financial industry.

Alleviating the worries about the talent flow towards finance, recent evidence from Metzker and Bohm (2015) suggests that the increase in the finance wage premium cannot be explained by the changing composition of talent. Even though the existing literature offers also other explanations for the potential reasons for surging wages, such as increased importance of *superstar effect* in the financial industry[1] (Bell and Van Reenen, 2010), *globalization* and the *increasing scale of financial institutions* (Kaplan and Rauh, 2010; Metzker and Bohm, 2015), the *skill-biased technological change* (Katz and Murphy, 1992; Garicano and Rossi-Hansberg, 2006; Metzker et al. 2015) and *financial innovation* (Metzker et al. 2015) it is clear that the exact reasons for the surging finance wage premium have not been fully discovered.

Engleberg, Gao and Parsons (2012) found that CEO's personal connectedness is a strong predictor for her personal compensation as firms may be willing to compensate better-connected CEOs for access to their networks and information advantages that they have. Other social networks literature has also found that connectedness has an effect on executive's compensation level and pay-for-performance sensitivity through compromised corporate governance (Kramarz and Thesmar, 2013; Nguyen, 2012; Hwang and Kim, 2009; Barnea and Guedj, 2009). Furthermore, management literature suggests executive's networks especially important in professional services firms through social capital development and customer acquisition (Harris and Helfat 1997; Nahapiet and Ghoshal, 1998; Hitt, Bierman, Shimizu and Kochhar 2001). Apart from the exact mechanism, it is clear that executive connections are things firms are willing to compensate.

[1] Bell and Van Reenen (2010) and Metzker and Bohm (2015) suggest that the *superstar effect* of CEOs (Gabaix and Landier, 2008) affects also outside of the top management in the financial industry (e.g. top performing managing directors)

In this study, I use U.S. executive compensation data and executives' personal relations with other executives and directors at other companies to find out whether finance wage premium can be explained by the excess pay on personal connectedness. I refer to (overall) connectedness as a number of individual connections by each executive.

To empirically test the hypothesis, I examine executive compensation of approximately 29,000 executives in large public firms in the U.S between 2000-2014. Following Engleberg, Gao and Parsons (2013) I construct my main explanatory variable, executive connectedness, by using BoardEx database that gathers biographical data on executives and directors. In line with Engleberg, Gao and Parsons (2013) I construct my measure of connectedness through the sum of each executives' past university connections, affiliations with charitable and volunteer organisations and past or current business relationships. Furthermore, I divide overall connectedness to industry connectedness and out-of-industry connectedness as firms within the same industry are more likely to have more relevant information (Engleberg, et al. 2013). In addition, I only include connections outside of the executive's current firm.

Consistent with the main hypothesis, I find that executives working in financial industry are better compensated for their connectedness in comparison to other industries. One additional connection in finance is worth slightly more than 8,000$ in annual pay, which is nearly a twice of the 4,000$ what non-finance receive. This suggest that either connections are more valuable in finance or executives are more effective at extracting rents from their employers in the financial industry. Similarly as Engleberg, et al. (2013) I find that the industry connections are more valuable than out-of-industry connections. Further, I find that industry connections are more valuable in finance than outside of finance.

In addition, I find that the relative size of the network in finance has increased throughout the sample period and surpassed non-finance sector in 2014 with 5 connections and having 146 total connections on average. Similarly to Engleberg, et.al (2013), I find that the effect of connectedness on pay decreases as the number of connections increase. Additionally, I find that in finance the effect is larger than in other industries which suggest that it is harder for finance executives to increase their network's value as number of connections increases.

Finally, I investigate whether the executive connectedness has impact on firm performance or valuation and find that both executive industry and out-of-industry connectedness improves firm performance in financial sector but not in other industries. Furthermore, I find that connections within the same industry are more valuable than out-of-industry connections, which suggests that higher pay for industry connectedness can be justified with improved performance.

On top of the key concentration areas, I find that the finance wage premium among top executives has significantly decreased after the financial crisis. In contrary to overall finance industry, the relative pay has not recovered from the drop of 2008-2009 on executive level. These previously undocumented results are in line with predictions made by

Philippon and Rashef (2012), who suggested that if new regulations (Dodd-Frank act, Basel 3) were effectively implemented, the excess wages on finance might diminish or disappear.

I make several contributions to existing social networks and executive compensation literature. Previously published research has discovered that connectedness has impact on the level of total compensation (Hallock, 1997; Hwang and Kim, 2009; Renneboog and Zhao, 2011). Furthermore, Engleberg, et al. (2013) found that CEOs are compensated for their networks. I extend these findings by arguing that connectedness is compensated also on non-CEO executive level.

Moreover, I find that the relative size of the networks in finance has increased throughout the years 2000-2014, which suggests that a part of finance wage premium can be explained with the excess pay on connectedness. I also find that industry connections are especially valuable within the financial industry, which suggests that finance executives' do not have skills as transferrable as executives in other industries. According to retention hypothesis presented by Liu, Nanda, Onal and Silveri (2018), lack of transferrable skills should decrease executive *outside employment options*, and thus diminish *pay for luck*[2].

Further contributing to compensation and social network literature, I find that executive connectedness, especially industry connectedness, has a positive impact on firm performance in the financial sector but not in other sectors. This suggests that executive connectedness within financial industry is based - at least to some extent - on pay–for-performance (Himmelberg, Hubbard, 2000).

This paper is organized as follows. In the next section, I provide background for my data and variable construction and describe stylized facts about finance wage premium and executive social networks. Section III provides evidence on the link between networks and finance wage premium. Sector IV documents the effect of connectedness on firm performance. Sector V includes additional robustness checks and describes empirical issues and section VI offers concluding remarks.

II. Data and Stylized facts

II.A. Data and Variable Construction

I use several different data sources to construct my variables and series below. Return and pricing data are collected from Center for Research in Security Prices (CRSP) annual stock return files. Company fundamentals are gathered from

[2] Empirical evidence suggests that executive compensation, in particular CEO compensation, is partly tied to industry-wide or market-wide returns, a practice that has been termed "pay for luck" (Bertrand and Mullainathan, 2001; Garvey and Milbourn, 2006)

Compustat annual files and ExecuComp monthly files. CRSP and Compustat are merged through link file generated by CRSP.

The biographic information of senior executives and directors is from BoardEx database by Management Diagnostic Limited, which is a private research company collecting social network data on company officials from U.S. and European public and large private companies. The database includes both inactive and active companies that have been traded between January 2000 and December 2014. BoardEx has information on various different facts about the specific executive, including the education, degree information, current employment status, past employment history, as well as roles in different social activities (foundations, charitable groups, club memberships among many others).

BoardEx has very limited coverage of U.S public companies prior to 2000 which is why I focus on the period of 2000-2014 which enables the effects of survivorship bias. Other authors have also suffered from similar concerns (Engleberg, et al. 2013, Fracassi and Tate 2012, Lallanne and Seabright 2011) and chose a similar styled sample or decided to focus on one-year cross-sectional observations (Fernandes et al. 2008). I further gather several company-level corporate governance variables from BoardEx, including the number of independent directors, duality and coopted boards to control my test results from deviations in board and ownership structures that culd have significant effect on executive compensation (Boyd, 1994; Sanders, Carpernter, 1998, Core, Holthausen, Larcker, 1999).

Furthermore, I collected compensation data from Standard and Poor's ExecuComp database that covers executives of companies in the S&P500, the S&P Midcap 400, and the S&P Smallcap. ExecuComp reports two summary measures of executive pay, TDC1 and TDC2. TDC2 estimates the value of total compensation realized by the executive in a given year whereas TDC1 estimates the total compensation awarded in the specific year. TDC1 uses estimated value of ex ante stock options granted by using the Black-Scholes formula. Similarly as Kaplan and Rauh (2012) I use the TDC1 compensation as it provides clearer picture of the compensation the company's board planned to pay for executive in each given year. After that, I match the BoardEx data with the data gathered from Compustat and CRSP using the S&P's Global Company Key (GVKEY), as well as individual specific Executive ID (ExecID).

My matching resulted in 2,474 unique firms with 29,265 unique executives and 129,610 unique firm-year observation with compensation and connectedness available during 2000-2014. From these observations, the financial industry is represented with 368 unique firms with 4,408 unique executives and 18, 664 unique firm-year observations.

Appendix B provides summary statistics on my connection -, compensation - and control variables in my sample. An executive has on average 92 connections, which are further divided into 21 industry connections and 110 out-of-industry connections on average. Substantially larger relative number of observations for industry connections decreases the

overall average in my sample. The standard deviation in each of the categories is also notable. Approximately 15% of executives in my sample have at least 200 connections. [3]

II.B. Finance Wage Premium

I first show the overall development of finance wage premium in the United States by representing the historical development of the relative wages between finance and non-finance in 1929-2017. Further, I represent the development of finance wage premium among executives in my sample.

I construct the historical time series by following Philippon and Rashef (2012) and building my full-time equivalent wages using Bureau Economic Analysis' (BEA) Annual Industry Accounts of the U.S. Similarly as Philippon and Rashef (2012) I define the Finance wage premium as an average wage in the financial sector related to nonfarm private sector excluding the financial sector. (1)

$$W_{fin,t} = \frac{W_{fin,t}}{W_{nonfarm,t}}$$

The financial sector consists of three subsectors: credit intermediation (banks, other saving institutions and companies that offer credit services, other finance industries (private equity, hedge funds, venture capital and securities) and insurance services. Similarly as Phillippon and Rashef (2012) I find that the relative wages have increased rapidly since the 1980s and the historical data has U-shape pattern for wages in 1929-2008 (Figure I). Nevertheless, I find that after the financial crisis the wage premium decreased slightly in 2008-2009 following by return to the pre-crisis level at 1.80 in 2017. In addition, the employment share of finance has decreased since 1980s and is currently at 5.4% from the nonfarm private sector which is in line with analysis made by Metzker and Bohm (2015). They further argue that this is partly due to the technological change that has already automatized large number of routine middle-skilled jobs such as accountants and secretaries.

Insert Figure 1 here

For the executives, I construct my time series by dividing executives based on two-digit NAICS codes (North American Classification System. Similarly as for the overall development I only use executives working in nonfarm private sector and compare them to executives in the financial industry.[4] In Figure 2 I represent distinctly the relative wage development for all executives, CEO's and non-CEO executives, as Bell and Van Reenen (2013) and Philippon and Rashef (2012)

[3] In undocumented calculations, I found that the average network for CEO is 115 which is close to the 117 CEO connections Engleberg, Gao and Parsons (2012) found in their research "The Price of the CEO's Rolodex"

[4] Nonfarm private sector constitutes from public government, agriculture, private households and non-profit organization employees

have argued about the extreme wage polarization among top executives in Finance. I find that finance wage premium for executives has in fact been large especially between 2002-2007. Furthermore, I find that the relative pay for finance executives has collapsed after the financial crisis in relation to other industries. Moreover, when comparing the relative wage development between finance CEO's and non-CEO executives to their non-finance peers we can further notice the drop has been even more dramatic for CEO's within the financial industry.

These findings suggest that the finance wage premium for CEO's has disappeared after the financial crisis and wage premium for non-CEO executives has decreased substantially. These new findings are not opposite to evidence offered by Phillippon and Rashef (2012) in the U.S, Bell and Van Reenen (2013) in the UK and Engleberg, et al. (2015) in Sweden for couple of distinctive reasons: My sample constitutes of top executives that comprise 0.02% of the employees within finance industry whereas previous literature has concentrated mainly on top quartile, decile or percentile. Secondly, I have been able to test the development with more extensive time horizon, especially for post-crisis. Finally, I have used precise compensation data from ExecuComp, whereas most recent literature covering finance executive pay in the US have approximated top wages using US Industry Accounts (Philippon and Rashef 2012) or CPS data (Metzker and Bohm 2012).

This radical decrease in the finance wage premium can be reasoned through the financial *re-regulation* (Dodd-Frank, Basel 3), as several authors have found evidence of a strong link between the financial deregulation and increasing relative wages in the financial industry (Philippon and Reshef, 2012; Bell and Van Reenen 2014; Boustanifar, Grant et al. 2017). Consistently, I find that relative wages for executives have not recovered from the crisis unlike it has happened for the overall industry (Engleberg, et al. 2012). However, my findings are not fully generalizable as ExecuComp data obscures the fact that there are a lot of highly paid professional within the financial firms that are not among top executives (Kaplan and Rauh, 2009).

Insert Figure 2 here

II.C. Executive Network

My primary explanation for finance wage premium is based on larger pay for executive's connectedness in finance. Social networks literature has discovered that connections increase the pay for executives (Engleberg, Gao and Parsons 2012; Lalanne and Seabright, 2011; Nquyen, 2012; Liu, 2014, Liu, Nanda, Onal and Silveri, 2018). Following Engleberg, et al. (2012) and Cohen, Frazzini and Malloy (2008) I construct main explanatory variable of my interest, connectedness,

through executives past or current business relationships, affiliations with charitable or volunteer organization, as well as universities attended (Engleberg, Gao and Parsons 2013). The connections are divided into following three categories:

Employment Connections:

Individuals that share an employment connection in year *t* have worked in or served on the board of the same organization simultaneously or prior *t*. I exclude the connections to the individuals currently working within the same company as the executive as the employment connections can simply mirror the size of the management team and board of directors.

Education Connections:

Similarly as Cohen, et al. (2008) and Engleberg, et al. (2012) I infer an education connection between two individuals in each specific year *t* if they went same school and received same type of degree within year of each other during or prior the year *t*.[5] Furthermore, I treat each satellite campus of the university systems like University of Texas, as a separate institution. In the case of missing campus name, I assume the school being the flagship campus.

Social Activities Connections:

For social activities connections such as involvement in charities, clubs and other non-profit organizations I follow Fracassi and Tate (2012) and require active participation of both individuals.[6] This means that both individuals' roles must exceed the membership, with the exception of social clubs.

Connectedness Measures

I measure the overall connectedness of the executive each given year by summing up each of the three types of connections the executive has with other executives and directors outside of the firm. I have reduced the impact of outliers by winsorizing the connectedness measure at the top and bottom percentiles. Furthermore, since the BoardEx coverage increases through time I have scaled the sum of each executive connections by the total number of executives and directors by BoardEx in year *t*. I have multiplied these measures by 1,000 to ease the analyses. Nevertheless, I have divided the connectedness further into two categories by following the Engleberg, et al. (2013)

[5]Following Cohen, Frazzini, Malloy (2008), we group degrees into six categories: (1). general undergraduate degrees such as BA and BS, (2). general Master's degrees such as MA and MS, (3). Doctoral degrees, (4). MBA, (5). Law degrees and (6). Medical degrees. We do not consider common professional qualifications such as Certified Public Accountant ornon-degree conferring programs such as executive management programs.

[6]Networks from social activities can also create value via non information-based channels, such as the granting of political favors (e.g., Faccio 2006; Faccio, Masulis, and McConnell 2006; Bertrand et al. 2005).

Industry Connectedness:

I construct industry connectedness similarly as overall connectedness but focus solely on connections within specific industry. I have classified the industries by using two-digit NAICS –code. Total industry connections are thus, the sum of each executive's connections in a given year within industry. Similarly as for overall connections, I have scaled the connections by dividing the sum of industry connections by the total number of executives and directors within the specific industry by BoardEx in year *t*. As done with overall networks, I have multiplied the sum by 1,000 and winsorized the measure at the top and bottom percentiles.

Out-of-Industry Connectedness

Out-of-industry measures simply the connections outside of each firms' industry. I construct this measure by subtracting each executives' overall connectedness and industry connectedness and further scaling the results with the subtraction of total number of overall connections and industry connections.

III. Networks and Finance Wage Premium

To test the main hypothesis of increasing connectedness as an explaining factor for finance wage premium I examine *four distinctive hypotheses*. Empirical specifications can be found in the Appendix A.

H-1: *Average pay for connectedness is greater* in the financial sector relative to the average pay for connectedness in the non-finance sector

H-2: *Average pay for connectedness increases over time* in the financial sector relative to average pay for connectedness in the non-finance sector

H-3: *Average connectedness is greater* in the financial sector relative to average connectedness in the non-finance sector

H-4: *Average connectedness increases over time* in the financial sector relative to average connectedness in the non-finance sector

III.A. Is the Connectedness Better Compensated in Finance?

III.A.I. Overall Connectedness

To test the first hypothesis I begin by running linear mixed-effect regressions, where I use executive pay (*natural logarithm of TDC1)* as the dependent variable. In Table 1, I regress each executive total compensation for her

connectedness. I include several standard controls, such as individual and company characteristics, as well as corporate governance controls and fixed-effects. The first column of the table proves the finance wage premium (Kaplan and Rauh, 2010; Philippon and Rashef, 2012; Metzker and Bohm, 2015). Column 2 proves the additional pay for connectedness as well as for the connectedness in the financial industry and indicates that one connection adds approximately 4 000$ for annual compensation in non-finance. The equivalent for finance is approximately 8 000$.[7] This is substantially lower than 17 000$ Engleberg, et al. (2012) found only for CEOs between 2000-2007, however in undocumented robustness check I found similar result (15 000$) when testing with the equivalent sample and controls[8]. In column 3, I include company characteristics to the regression, which slightly decreases the coefficients of both overall networks and interaction between finance and networks. It is also notable that working in finance seems to lower executive's compensation on its own. This is mostly explained by larger average total assets (*natural logarithm*) in the financial industry. Impacts of the networks in finance and in non-finance to compensation do not change substantially when adding industry fixed-effects. In column 5, I added the squared term of networks and the interaction between finance and networks. Both terms have a negative coefficient, indicating decreasing pay for connectedness in executive compensation regression. These findings are in line with Engleberg, et al. (2012). Standard errors are clustered by firm to allow for unobserved firm-level shocks to executive pay to persist over time. Furthermore, this means that my standard errors are robust for heteroscedasticity.

Insert Table 1 here

In unreported robustness check, I exclude insurance firms from the sample (NAICS codes 524-), following Kaplan and Rauh (2009), as they argue insurance companies as not "Wall Street" type firms that should be excluded from the sample. Similarly as Philippon and Rauh (2012), I find no significant difference when excluding insurance firms from the sample. Positive impact of interaction between finance and networks on compensation seemed even slightly stronger. In contrary, the core finance premium in columns 1 and 2 decreases slightly.

III.A.II. Industry and Out of-Industry Connectedness

In table 3, I divide the connectedness to industry and out-of-industry connectedness and regress each executive's total compensation with these measures of connectedness separately. In column 1, we can see that the industry connections have a positive effect on executive compensation, which is logical since executives would appreciate information about her own industry. This indicates that either industry connections are considered to be more valuable in finance, or industry connections increase executive's *outside employment options* and *mobility* in finance more than in other industries Liu,

[7] Calculated from scaled networks
[8] Excluding idiosyncratic volatility and having executive age instead of her tenure

Nanda, Onal and Silveri (2018). Adding company characteristics and industry fixed-effects in column 2 decreases the effect of networks both in finance and non-finance, but networks in finance remain substantially more valuable.

In column 3 we notice that out-of-industry connectedness has a positive effect on executive pay. The magnitude of the impact is similar with industry connectedness for both finance and non-finance industries but in finance the out-of-industry connections are compensated less. Adding industry fixed-effects in the column 4 decreases pay for out-of-industry networks in non-finance and makes the coefficient for the interaction insignificant.

Insert Table 3 here

III.B. Has the Average Pay for Connectedness Increased in Finance Over Time?

To test the second hypothesis I first test how the finance wage premium has developed in 2000-2014. I regress the total compensation in finance by using year dummies. In column 1, we can see that the finance wage premium decreased a lot during the financial crisis. After the crisis, the premium recovered slightly but still remains at a lower level than prior to the crisis. However, large standard errors for coefficient during and after the crisis, when controlling only for individual characteristics (gender, age and CEO), suggest that these results are statistically insignificant. When adding the individual fixed-effects we can derive significant results also from 2007-2014. These results indicate that the finance wage premium coefficient has decreased to half from the levels prior crisis. Standard errors are clustered by firm-level to control for heteroscedasticity.

Column 3, shows the yearly development of the *finance network premium* in 2000-2014 when controlled for individual characteristics, firm characteristics, year fixed-effects and industry fixed-effects. I find that over the sample period, networks in finance have consistently been more valuable than in non-finance. The premium decreases slightly during the financial crisis in 2008-2010 but results for the 2008 and 2009 are statistically insignificant. After the crisis, in 2011-2013 we see that the pay for connectedness in the financial sector increased to a higher level than prior to the crisis. This suggests, again, that executives in finance are increasingly paid for their connectedness whereas the overall wage premium in comparison to other industries decreases.

III.C. Is Finance More Connected Than Other Industries?

If executives in Finance are paid more for each of their connection, it is worth to examine what is the size of the relative network in finance in comparison to non-finance. This enables us to distinct the effect of connectedness on compensation to *relative quantity* of connections and *relative quality* on each connection.

To test hypotheses 3 and 4 I construct time series for relative networks between finance and non-finance. I use data from BoardEx and calculate the connections similarly as Engleberg et al. (2012). Following Liu, et al. (2018), I have scaled yearly connections with the total number of connections in BoardEx database to make the time series comparable. Looking at Figure 3 we can see that relative wages in finance have historically been higher for finance executives than non-finance executives. However, relative connectedness in finance has increased since 2000 (0.77) and raises slightly above non-finance executives in 2014 (1.03). This suggests that demand for networks has risen in the financial industry in relation to other industries. There is also a significant difference between the connectedness of non-CEO executives and CEOs in finance, which suggests that non-CEO executive´s need to be more connected than CEOs to work in finance.

Insert Figure 3 here

Looking at the development of connectedness within other industries in Table 4, we find that networks in Finance have grown at a yearly pace of 12.3% (Table 5) which is the second highest pace after Real Estate Rental and Leasing, when considering only industries with more than 1 000 observations. Executive's average size of network in 2014 was 146 connections. Comparable numbers for Information[9] (189) and for Professional Services[10] (175) suggest that connectedness among finance executives is still behind other industries with high human capital and income.

Insert Table 5 here

As a robustness check, I regress the connectedness with a finance dummy and different controls to examine how industry, company and individual characteristics affect to the level of connectedness (Table 6). In column 1, when controlling only for year fixed-effects I find similarly as Lalanne and Seabright (2011) that women have larger networks than men, and that CEOs are a lot more connected than non-CEO executives. The coefficients for these variables do not drastically change when including company characteristics, industry fixed-effects as well as firm fixed-effects in columns (2) – (4). However, after including these effects we find that company size (natural logarithm of assets) is an important determinant of executive connectedness similarly as (Bertrand and Hallock, 2001; Engleberg et al. 2012).

Insert Table 6 here

As a second robust check, I test whether external connections have an interaction between finance and year affect to connectedness on each observed year (Table 7). When having the fixed year effects in column 1 I find similar results as

[9] Information industry in NAICS (code 51) includes Newspapers, Software Publishers, Motion Picture and Video Industries, Sound Recording Industries, Telecommunications, Data processing, Hosting and Related Services and Other Information Services.
[10] Professional services industry in NAICS (code 54) includes Legal Services, Accounting Services, Architectural and Engineering Services, Specialized Design Services, Computer System Design and Related Services, Consulting Services, Scientific Research and development services, advertising and public relations and other professional services.

in previous tests. Furthermore, the results after including firm-fixed effects in column 2 and individual effects in column 3 support my findings that finance executives were more connected in 2014 than they had been during the whole 21st century. In undocumented robustness checks, I clustered the standard errors by firm and individual and found that my results are robust for heteroscedasticity.

Insert Table 7 here

IV. Executive Connectedness and Firm Performance

In this section, I investigate external connections effect on firm performance and further examine if the executives in finance are paid for their performance or they are only better at extracting rents from their employers. I report these results in Table 8. The dependent variable of my regressions is Tobin's Q that measures firm's performance or valuation. I lag all the independent variables by one year to model the causality of each year's connectedness to the period I would expect the connectedness to have impact on firm performance. Furthermore, I control my regression for firm-specific R&D expenditures as several empirical studies have documented a positive impact between R&D investment and firm productivity and sales growth (Lichtenberg and Siegel, 1991; Hall and Mairesse, 1995; Belderbos, Carree, Lokshin, 2004).

Insert Table 8 here

In column 1, I regress the whole sample of industry connections on Tobin's Q, controlling for year- and firm fixed-effects and company characteristics similarly as Liu et al. (2018), I find that the coefficient of the interaction between finance and networks is positive which suggests that connectedness is more valuable for firms in finance than in other industries. In line with the findings of Liu, Nanda, Onal and Silveri, (2018), I find that overall connectedness is not statistically different from zero for non-finance sector that comprises most of my sample. As expected, the level of R&D has a large positive effect on a firm's performance. In columns, 2 and 3 I divide the sample for *industry connectedness and out-of industry connectedness*. In column 2, I find that the industry connections have a positive impact on firm's value in the financial industry and negative impact in other industries. These results are in line with Liu,et al. (2018) who found that industry connectedness has a negative impact on industries with low enforcement of non-compete clauses and positive for industries with high enforcement, such as the financial industry. Nevertheless, I find that the interaction between out-of-the industry connections and finance is positive which indicates that firms benefit also from the connections their executives have outside of the financial industry. The impact on performance is, however, significantly lower than with industry connections. This might suggest that finance executives do not possess such transformable skills and knowledge

as other executives and thus they cannot benefit as much from connections and information outside of the financial industry. As an undocumented robustness check, I tested the financial industry and the non-financial industry separately, without the interaction term and R&D control. I found similar results, except that the positive impact of industry connectedness in finance had a smaller magnitude and was statistically insignificant.

V. Additional Robustness Checks and Empirical Issues

V.A. Additional Robustness Checks

As an additional undocumented robustness check, I test whether the connectedness of executives in other industries has a positive impact on firm performance. I concentrated on executives working in professional services and information services[14], as these industries have, similarly to finance, higher human capital than other industries on average (Metzker and Bohm, 2015). I find no significant results for the link between firm performance and executive connectedness in information services. In professional services, the executive's out-of-industry connectedness seems to have a slightly negative impact on firm performance. These discoveries suggest that, the connectedness in the financial industry is especially valuable even in comparison to other skill-biased industries such as consultancies and software publishers. Furthermore, these results support the argument that the executives working in the financial industry are not having as transferrable skills as other industries which increases the firm performance through lower managerial mobility (Liu, et al. 2018).

In addition, I tested the relationship between compensation and connectedness in finance when controlling for *managerial ability -score* which is a measure based on CEOs efficiency in generating revenue that was developed by Demerjian, Lev and McVay (2012). I find that when controlling for *managerial ability*, the coefficient for the interaction between finance and connectedness on compensation turns negative and insignificant when controlling for fixed year-effects. Results stay similar when controlling for other fixed-effects and other company controls and individual characteristics, such as age and gender of the executive. However, the results are not statistically significant. It is also hard to distinct the relationship between connectedness and managerial ability-score, which makes it impossible to draw any conclusions even with significant results.

V.B. Empirical Issues

One of my key contributions in this study is to examine the effect of executive connectedness on compensation. In doing so, it is important to realize the biggest strengths and weaknesses of my empirical methods.

One of my biggest strengths is that the data on executive networks and compensation is very detailed which give opportunities to run tests with variation. Furthermore, I have more extensive time period than previous authors that enables me to find more robust results.

On the weaknesses, I have little meaningful time series variation in the size or composition of executive's network. In other words, it is hard to distinguish how much the network measure is correlated with other executive attributes, firm attributes and/or firm-executive match quality. To conclude, I will be limited to establish the actual causal relations between networks, compensation, firm performance and working in finance or non-finance, but I am still able to do precise estimations about the distinctions between difference variables.

VI. Conclusion

In this study, I examine whether value and size of networks in the financial industry can explain the surging finance wage premium. In addition, I examine if the compensation on connectedness has impact on firm performance. The sample consist of 29,000 executives from large listed companies in the U.S. between 2000 and 2014.

I find that executives working in the financial industry are better compensated for their connectedness than executives working in other industries, such as manufacturing and retail. One additional connection in finance is worth slightly more than 8,000$ in annual compensation, which is nearly twice as much as the 4,000$ outside finance. Furthermore, I find that the relative size of the networks within the financial industry has increased during the past 15 years. Moreover, I find similarly as Engleberg, et al. (2012) that connections within the same industry are likely to be more valuable than out-of-industry connections. My results stay consistent when testing several different fixed-effects, company and individual controls, as well as corporate governance controls.

In addition, I find a strong link between executive connectedness and firm performance in finance which suggests that connectedness within the financial sector is based on, at least to some extent, improved firm performance or valuation. In contrary, I find that connectedness in other industries does not a have significant effect on firm value, which could derive from better executive mobility and thus, improved outside employment options within senior management in other industries. (Liu, Nanda, Onal and Silveri, 2018)

Finally, in previously undocumented evidence for finance wage premium, I find that relative pay for top executives in finance has decreased significantly after the financial crisis. Taking into consideration the increased financial regulation after the crisis, especially in the U.S and Europe (e.g. Dodd-Frank, Basel 3), my finding is in line with existing

compensation literature (Philippon and Rashef, 2012, Boustanifar, et al. 2017) which suggests low financial regulation as one of the key factors for the finance wage premium.

Overall, this paper contributes to social network and compensation literature by offering networks as an evidence for finance wage premium. Furthermore, this paper offers evidence for the link between executive connectedness and improved firm performance within the financial sector. However, the findings in this paper are limited to a large, but restricted, sample of top executives in the United States, which highlights the need for further investigations with more comprehensive data. For future research, the findings of this paper present a new direction for researching the links between social capital, compensation and firm performance.

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Figure 1: Finance Relative Wages and Employment in the U.S. Overall Economy

This graph shows the development of the *relative wages* and *employment share* of the financial industry for the years 1929-2017. *Relative wage* (left-hand side) is measured as a ratio between the wage in finance and the wage in non-financial, nonfarm private sector. *Employment share* (right-hand side) is defined as a number of employees in the financial industry in relation to the total number of workers in the nonfarm private sector. Source: Bureau of Financial Analysis (BEA) Industry accounts

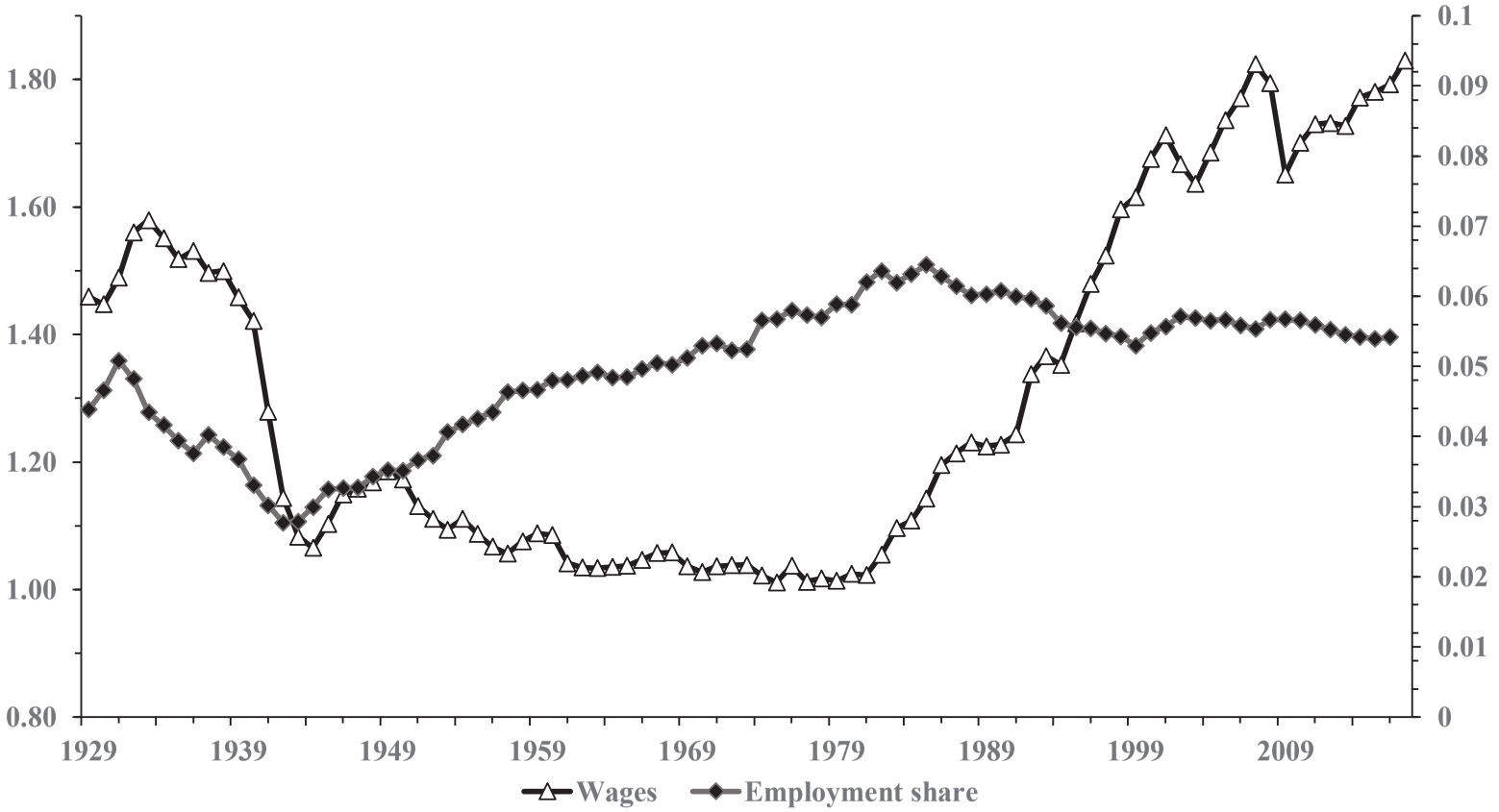
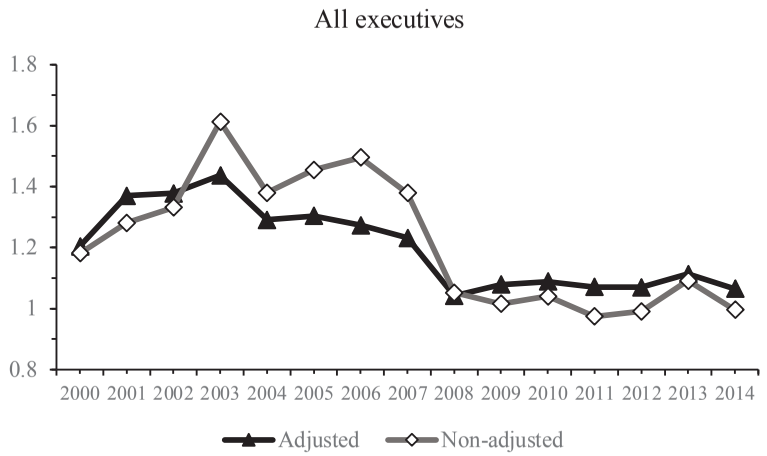
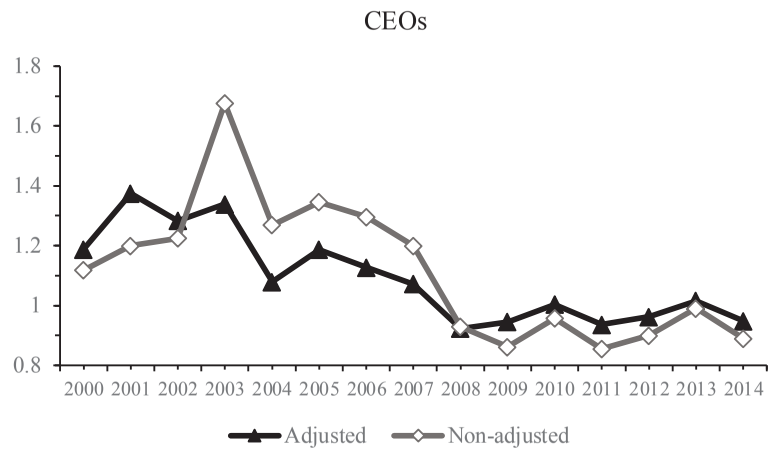


Figure 2: Executive Relative Wages in the U.S.

These graphs represent the relative wage development in the financial sector compared to nonfarm private sector during 2000-2014 in the U.S. First figure includes all of the executives in the sample, second figure only the CEOs and third figure only the Non-CEO executives. *Non-adjusted* numbers include all the 135 579 observations from my ExecuComp –sample and *adjusted* numbers are winsorized at the top and bottom percentiles, having 132 907 observations. I have used ExecuComp's *TDC1* as a compensation measure in all figures Sources: Compustat ExecuComp; North American Industry Classification System (NAICS)





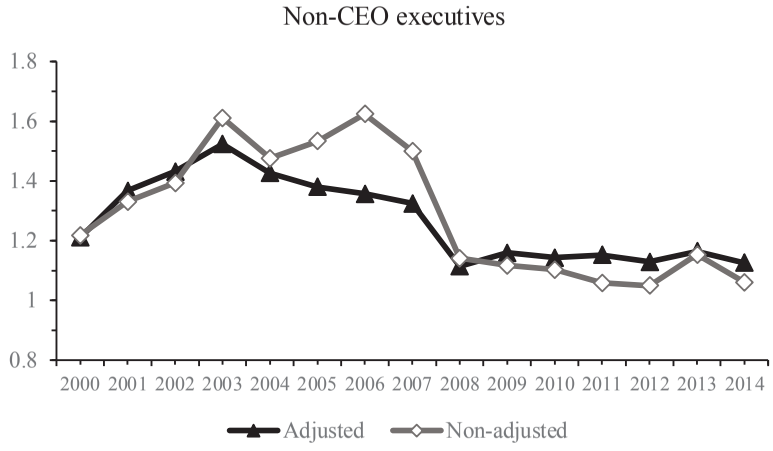


Figure 3: Executive Relative Networks in the U.S.

This graph shows the development of relative networks among executives between financial sector and the rest of the economy in 2000-2014. Relative networks are calculated as the ratio between networks in finance and in the non-financial sector. I have constructed the network for each executive through methods used by Engleberg, Gao and Parsons (2012). Source: BoardEx

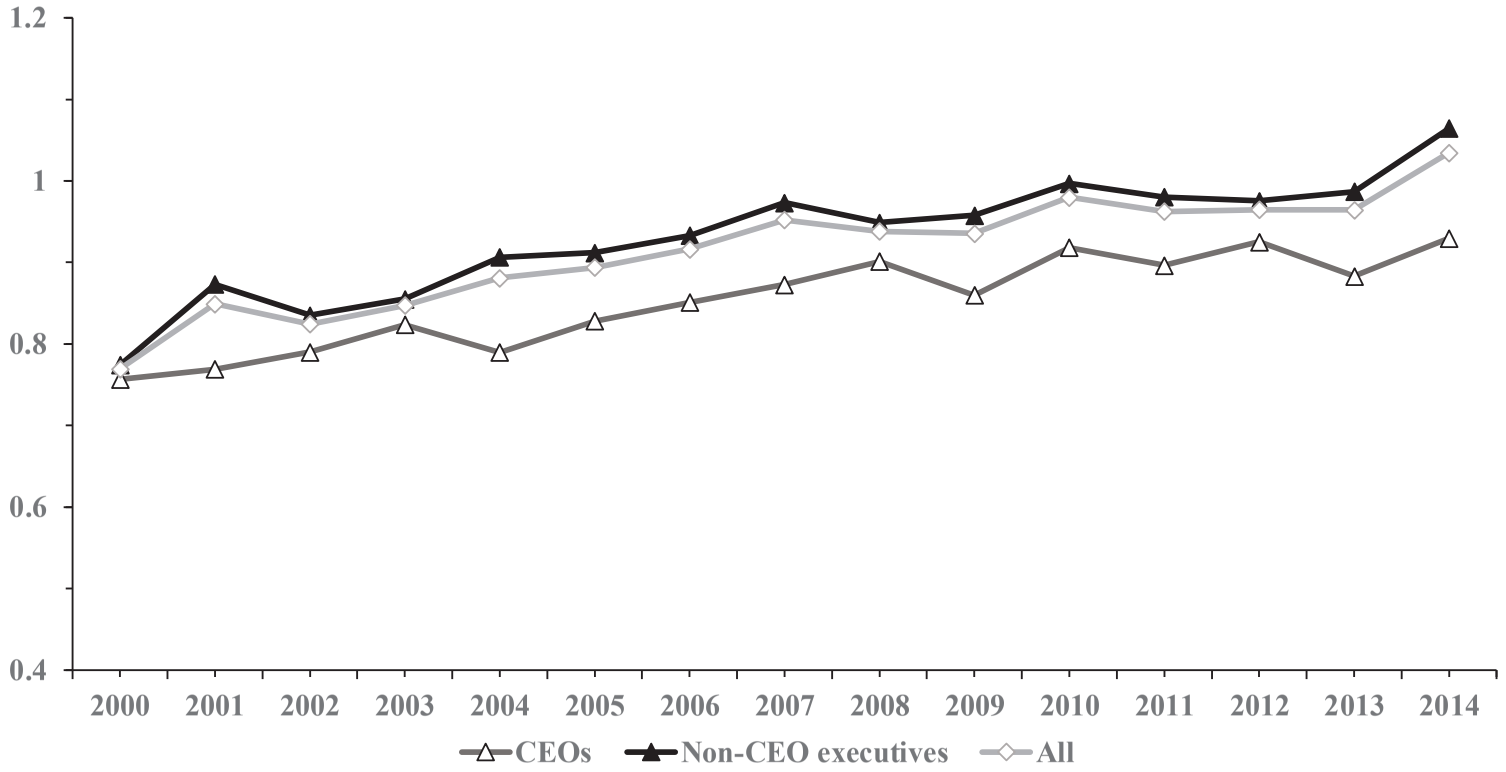


Table 1: Executive Connectedness and Level of Compensation

This table provides evidence on the effect of executive connectedness on the level of executive compensation. The dependent variable in all columns, is CEO Total Direct Compensation awarded (TDC1) in natural logarithm. All columns include year fixed-effects Column (3) includes also industry fixed-effects and company- and corporate governance controls and column (4) includes industry- and firm fixed-effects and company- and corporate governance controls. Column (5) includes squared scaled networks to column (4). Definitions of all variables are provided in Appendix C. Robust t-statistics clustered by firm are reported in brackets s; ***p<0.01, ** p<0.05, * p<0.1. Sources: BoardEx, ExecuComp, CRSP, Compustat

Dependent variable:	*Total compensation (Ln)*				
	(1)	(2)	(3)	(4)	(5)
Network		0.092***	0.023***	0.024***	0.049***
		[0.002]	[0.004]	[0.002]	[0.004]
Network squared					-0.004***
					[0.001]
Network x Finance		0.084***	0.064***	0.067***	0.089***
		[0.006]	[0.006]	[0.005]	[0.013]
Network squared x Finance					-0.007**
					[0.002]
Finance	0.089*	0.058	-0.673***		
	[0.004]	[0.040]	[0.010]		
Female			-0.103***	-0.109***	-0.109***
			[0.009]	[0.009]	[0.009]
CEO			0.900***	0.900***	0.946***
			[0.009]	[0.009]	[0.006]
Prior year return			-0.002	-0.002	-0.002
			[0.000]	[0.000]	[0.000]
Prior two years return			0.005***	0.006***	0.006***
			[0.000]	[0.000]	[0.000]
Ln (Assets)			0.340***	0.350***	0.349***
			[0.002]	[0.002]	[0.002]
ROA			0.007***	0.006***	0.006***
			[0.001]	[0.000]	[0.000]
Lag_ROA			0.001	-0.001	-0.000
			[0.000]	[0.000]	[0.000]
Market-to-book			0.001***	0.000***	0.000***
			[0.000]	[0.000]	[0.000]
Indiprs			-0.167***	-0.024	
			[0.020]	[0.020]	[0.020]
Duality			0.044***	0.046***	0.046***
			[0.005]	[0.005]	[0.005]
Coopted Board			0.001	-0.007*	-0.007*
			[0.001]	[0.006]	[0.006]
Overlap			-0.001***	-0.001***	-0.001***
			[0.00]	[0.00]	[0.00]
PIB			0.195***	0.166***	0.166***
			[0.006]	[0.005]	[0.005]
Tangible assets			-0.410***	-0.398***	-0.390***
			[0.012]	[0.016]	[0.016]
Year fixed-effects	No	No	Yes	Yes	Yes
Firm-fixed-effects	No	No	No	Yes	Yes
Observations	132 942	111 619	73 620	73 620	73 620
Adjusted R^2	0.023	0.046	0.544	0.561	0.561

Table 2: Executive Total Level of Compensation

This table provides evidence on the effect of executive connectedness on the level of executive compensation in different categories. The dependent variable in all columns, is CEO Total Direct Compensation awarded (TDC1). Columns (1), (3) and (5) include year-fixed effects and columns (2), (4) and (6) include year- and industry fixed-effects and company- and corporate governance controls (from Table 2). Columns (1) and (2) use the overall *connectedness*, columns (3) and (4) *industry connectedness* and columns (5) and (6) *out-of-industry connectedness* as an explanatory variable for *Total Compensation*. *Executive age* excluded as the effect on sample size would reduce significantly. Robust t-statistics clustered by firm are reported in brackets s; ***p<0.01, ** p<0.05, * p<0.1. Sources: BoardEx, ExecuComp, CRSP, Compustat

Dependent variable:	*Total compensation*					
Connectedness:	Overall		Industry		Out-of-industry	
	(1)	(2)	(3)	(4)	(5)	(6)
Network	312.45***	235.40***	8.44***	5.69***	207.97***	136.50***
	[7.46]	[8.40]	[0.21]	[0.27]	[8.65]	[7.64]
Network x Finance	376.54***	21.72	46.68***	26.91***	163.41***	-40.03
	[19.99]	[26.11]	[1.11]	[1.42]	[22.79]	[25.02]
CEO	2551.00***	2633.00***	2433.45***	2622.00	2715.24***	2954.00***
	[23.23]	[25.70]	[22.69]	[25.00]	[30.78]	[29.20]
Female	-293.70***	-308.70***	-254.79***	-302.00***	-227.97***	-327.30***
	[36.13]	[40.72]	[35.87]	[40.12]	[48.02]	[44.35]
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Company controls (Table 1	No	Yes	No	Yes	No	Yes
Industry fixed-effects	No	Yes	No	Yes	No	Yes
Observations	86 859	73 551	87 419	78 231	55 096	46 655
Adjusted R^2	0.185	0.315	0.185	0.310	0.177	0.315

Table 3: Yearly Wage Premium and Compensation on Connectedness in Finance

This table presents evidence on the effect of finance wage premium and effect on connectedness on compensation on yearly level in between 2000 and 2014. The dependent variable in all panels is natural logarithm of Total Direct Compensation awarded (*TDC1*). Column (1) describes yearly finance wage premium with only controlling for individual characteristics. Column (2) includes individual fixed-effects. Column (3) describes the yearly premium on finance connections with company- and corporate governance controls, individual characteristics controls (female, CEO and age) and yearly- and industry-fixed controls. Robust t-statistics clustered by firm are reported in brackets; *** p<0.01, ** p<0.05, * p<0.1. Sources: BoardEx, ExecuComp, CRSP, Compustat

Dependent variable:	*Total compensation (Ln)*		
	(1)	(2)	(3)
		Finance	Network x Finance
2000	0.135***	0.185***	
	[0.035]	[0.046]	
2001	0.264***	0.270***	0.048*
	[0.033]	[0.044]	[0.020]
2002	0.280***	0.297***	0.068***
	[0.029]	[0.044]	[0.019]
2003	0.246***	0.330***	0.068***
	[0.029]	[0.044]	[0.020]
2004	0.172***	0.269***	0.047**
	[0.029]	[0.044]	[0.017]
2005	0.177***	0.297***	0.052**
	[0.031]	[0.043]	[0.017]
2006	0.153***	0.286***	0.056**
	[0.029]	[0.043]	[0.018]
2007	0.066*	0.207***	0.058**
	[0.027]	[0.043]	[0.022]
2008	-0.043	0.104*	0.033
	[0.027]	[0.043]	[0.026]
2009	-0.019	0.132**	0.041
	[0.027]	[0.043]	[0.021]
2010	-0.044	0.083	0.041*
	[0.028]	[0.043]	[0.018]
2011	0.003	0.146***	0.094**
	[0.029]	[0.043]	[0.029]
2012	0.023	0.171***	0.060**
	[0.029]	[0.043]	[0.022]
2013	0.061	0.199***	0.087***
	[0.029]	[0.043]	[0.025]
2014	0.023*	0.161***	-0.188
	[0.029]	[0.044]	[0.024]
Year fixed-effects	No	No	Yes
Company controls (Table 1)	No	No	Yes
Industry fixed-effects	No	No	Yes
Individual fixed-effects	No	Yes	No
Observations	87 208	87 208	74 623
Adjusted R^2	0.174	0.791	0.570

Table 4: Executive Connectedness and Compensation within Different Industries

This table provides evidence on the effect of executive connectedness on the level of executive in different industries. The dependent variable in all columns, is executive total direct compensation awarded (TDC1). For industry separation I use two-digit NAICS-codes. All columns include year fixed-effects. Further column (2) include industry fixed-effects and column (3) company- and corporate governance controls. Robust t-statistics are reported in brackets; ***p<0.01, ** p<0.05, * p<0.1. Sources: BoardEx, ExecuComp, CRSP, Compustat

Dependent variable:	*Total compensation (Ln)*		
	(1)	(2)	(3)
Finance	0.064***	0.184***	0.067***
	[0.006]	[0.005]	[0.005]
Utilities	0.098***	0.114***	0.049***
	[0.009]	[0.013]	[0.017]
Construction	0.076***	-0.030	-0.079***
	[0.015]	[0.019]	[0.017]
Manufacturing	0.103***	0.113***	0.026***
	[0.004]	[0.008]	[0.005]
Wholesale Trade	-0.014	0.029**	0.000
	[0.008]	[0.010]	[0.009]
Retail Trade	0.112***	0.093***	0.009
	[0.010]	[0.014]	[0.008]
Transportation and Warehousing	0.616***	0.352***	0.065
	[0.062]	[0.094]	[0.089]
Information	0.140***	0.105***	0.019***
	[0.005]	[0.006]	[0.006]
Mining	0.154***	0.045**	-0.027*
	[0.011]	[0.014]	[0.013]
Real Estate Rental and Leasing	0.025**	0.041***	0.062***
	[0.008]	[0.010]	[0.012]
Professional, Scientific and Technical Services	0.048***	0.085***	0.025**
	[0.006]	[0.008]	[0.008]
Adimistrative and Support and waste Mgmt	0.048***	0.051***	-0.028
	[0.010]	[0.013]	[0.012]
Educational Services	-0.054**	-0.012	-0.047
	[0.010]	[0.023]	[0.019]
Health Care and Social Assistance	0.046***	0.025	0.009
	[0.013]	[0.017]	[0.015]
Arts, Entertainment, and Recreation	-0.003	-0.026	-0.017
	[0.033]	[0.042]	[0.037]
Accommodation and Food services	0.094***	0.039*	0.000
	[0.012]	[0.015]	[0.014]
Other Services (except Public Administration)	0.001	0.073*	0.098***
Year fixed-effects	Yes	Yes	Yes
Industry fixed-controls	No	Yes	Yes
Company controls (Table 1)	No	No	Yes
Observations	111 591	86 855	57 705
Adjusted R^2	0.023	0.217	0.574

Table 5. Development of Relative Networks within Different Industries

This table describes the development of relative networks within nonfarm private industries in 2000-2014. Relative networks are measured similarly as in Figure 3. Source: BoardEx

NAICS	Industry	Avg. size in 2000	Avg. size in 2014	Avg. Growth	Number of observations
21	Mining	22	105	11.6 %	5 399
22	Utilities	26	110	10.7 %	5 867
23	Construction	24	99	10.7 %	1 739
31-33	Manufacturing	38	145	10.0%	52 031
42	Wholesale Trade	43	126	7.9%	3 900
44-45	Retail Trade	32	126	10.4%	8 023
48-49	Transportation and Warehousing	31	108	9.2 %	3 202
51	Information	50	189	9.9 %	11 144
52	Finance and Insurance	29	146	12.3 %	17 427
53	Real Estate Rental and Leasing	23	118	12.5 %	5 575
54	Professional, Scientific and Technical Services	53	175	8.9 %	5 098
56	Adimistrative and Support and waste Mgmt	36	170	11.8 %	2 832
61	Educational Services	33	144	11.1 %	779
62	Health Care and Social Assistance	34	115	9.0 %	2 186
71	Arts, Entertainment, and Recreation	18	149	16.3 %	404
72	Accommodation and Food services	22	129	13.6 %	2 885
81	Other Services (except Public Administration)	25	241	17.6 %	452

Table 6: Level of Connectedness and Individual- and Company Characteristics

This table describes the effects of different company- and individual characteristics on the level of executive connectedness, e.g. size of the network in 2000-2014. All the columns include year-fixed effects. Column (2) includes company characteristics, column (3) includes company characteristics and industry fixed-effects and column (4) further include firm fixed-effects to column (3). Since the BoardEx coverage increases through time, I have constructed comparable measure of *connectedness* by scaling each executive connections by the total number of executives and directors by BoardEx in year *t*. I have multiplied these measures by 1,000 to ease the analyses. Robust t-statistics are reported in brackets; ***p<0.01, ** p<0.05, * p<0. 1. Sources: BoardEx, CRSP, Compustat

Dependent variable:	*Connectedness (scaled)*			
	(1)	(2)	(3)	(4)
Female	0.161***	0.163***	0.194***	0.138***
	[0.017]	[0.019]	[0.019]	[0.018]
CEO	0.261***	0.270***	0.269***	0.231***
	[0.011]	[0.012]	[0.012]	[0.011]
Age	-0.014***	-0.015***	-0.013***	-0.010***
	[0.001]	[0.001]	[0.000]	[0.001]
Finance	-0.068***	-0.026		
	[0.013]	[0.095]		
Ln (Assets)		0.108***	0.160***	-0.062***
		[0.003]	[0.003]	[0.010]
Sales Growth		-[0.000]	-[0.000]	-[0.000]
		[0.000]	[0.000]	[0.000]
Market-to-book		0.000**	-[0.000]	-[0.000]
		[0.000]	[0.000]	[0.000]
Year fixed-effects	Yes	Yes	Yes	Yes
Industry fixed-effects	No	No	Yes	Yes
Firm fixed-effects	No	No	No	Yes
Observations	91 367	79 341	79 341	76 962
Adjusted R^2	0.041	0.061	0.0848	0.265

Table 7: Development of Executive Connectedness within the Financial Industry

This table describes the development of executive connectedness within the financial industry. All the columns include year-fixed effects and individual characteristics (female, CEO and age). Column (2) includes company characteristics and column (3) includes firm fixed-effects and individual fixed-effects. Since the BoardEx coverage increases through time, I have constructed comparable measure of *connectedness* by scaling each executive connections by the total number of executives and directors by BoardEx in year *t*. I have multiplied these measures by 1,000 to ease the analyses. Robust t-statistics are reported in brackets; ***p<0.01, ** p<0.05, * p<0. 1. Sources: BoardEx, CRSP, Compustat

Dependent variable:	*Connectedness (scaled)*		
	(1)	(2)	(3)
Female	0.158***	0.131***	
	[0.018]	[0.017]	
CEO	0.262***	0.242***	0.037***
	[0.011]	[0.010]	[0.005]
Age	-0.013***	-0.011***	0.001*
	[0.000]	[0.001]	[0.004]
Finance	-0.426***		
	[0.081]		
Finance x 2001	-0.011	0.038	0.039
	[0.110]	[0.102]	[0.022]
Finance x 2002	0.239*	0.246*	0.092***
	[0.111]	[0.099]	[0.023]
Finance x 2003	0.311**	0.332***	0.175***
	[0.105]	[0.094]	[0.022]
Finance x 2004	0.311**	0.316***	0.181***
	[0.104]	[0.093]	[0.022]
Finance x 2005	0.372***	0.353***	0.178***
	[0.104]	[0.094]	[0.023]
Finance x 2006	0.356***	0.288**	0.197***
	[0.100]	[0.083]	[0.023]
Finance x 2007	0.399***	0.286***	0.212***
	[0.091]	[0.083]	[0.022]
Finance x 2008	0.375***	0.268**	0.206***
	[0.091]	[0.084]	[0.022]
Finance x 2009	0.375***	0.285***	0.213***
	[0.092]	[0.084]	[0.022]
Finance x 2010	0.427***	0.321***	0.216***
	[0.092]	[0.084]	[0.022]
Finance x 2011	0.372***	0.282***	0.221***
	[0.092]	[0.084]	[0.022]
Finance x 2012	0.373***	0.294***	0.224***
	[0.092]	[0.085]	[0.023]
Finance x 2013	0.364***	0.291***	0.237***
	[0.093]	[0.085]	[0.023]
Finance x 2014	0.397***	0.335***	0.262***
	[0.093]	[0.086]	[0.022]
Year fixed-effects	Yes	Yes	Yes
Firm fixed-effects	No	Yes	Yes
Individual fixed-effects	No	No	Yes
Observations	91 806	89 328	67 836
Adjusted R^2	0.042	0.267	0.970

Table 8: Executive Connectedness and Firm Performance

This table presents evidence on the effect of executive connectedness on firm value. The dependent variable in all panels is Tobin's Q at t+1. Definitions of all variables are provided in Appendix C. Year and firm fixed-effects are included in all panels. Column (1) uses overall connections, Column (2) industry connection and column (3) out-of-industry connections. Robust t-statistics clustered by firm are reported in brackets; *** p<0.01, ** p<0.05, * p<0.1. Sources: BoardEx, ExecuComp, CRSP, Compustat

Dependent Variable:	*Tobin's Q* $_{t+1}$		
Connectedness:	All	Industry	Out-of-industry
		(1)	(4)
Sample:		All	All
Scaled networks	-0.000	-0.001***	-0.000
	[0.003]	[0.000]	[0.002]
Network x Finance	0.105*	0.022***	0.093*
	[0.049]	[0.003]	[0.037]
Tangible_Assets	-0.647***	-0.996***	-0.965***
	[0.099]	[0.085]	[0.111]
Ln (Total_Assets)	-0.511***	-0.509***	-0.551***
	[0.013]	[0.011]	[0.023]
ROA	0.004***	0.003***	0.002***
	[0.000]	[0.000]	[0.000]
ROA $_{t-1}$	0.000	-0.001***	-0.000*
	[0.000]	[0.000]	[0.000]
R&D	1.812***	1.674***	1.733***
	[0.119]	[0.105]	[0.129]
Year fixed-effects	Yes	Yes	Yes
Firm fixed-effects	Yes	Yes	Yes
Observations	42 890	42 890	28 186
Adjusted R^2	0.654	0.687	0.665

Appendix A: Empirical Specifications

Following Lazear and Oyer (2010), I construct the executive *i* wage on time *t* and firm *j* as follows:

$$W_{i,t,j} = f(a_{i,t}, B_{j,t}\Phi_{i,j,t}) + \varepsilon_{i,j,t} \quad (1)$$

First argument represents *generic executive attributes*, *a,* into her compensation. These attributes can be intelligence, managerial skills, socials skills or anything else that are valued consistently across firms. The second argument, *B*, represents the effect of *firm characteristics* on executive productivity and compensation. The last argument stands for *match quality* that depends on both firm and executive's characteristics. For example, large conglomerate could be a particularly good fit for executive with past international work experience.

Assuming connectedness, *c,* as an individual attribute of *generic executive attributes* we can further specify the *a,* as follows

$$a_{i,t} = c_{i,t} + s_{i,t} + \varepsilon_{i,t} \quad (2)$$

where, $c_{i,t}$ represents executive connectedness, $s_{i,t}$, other *executive generic attributes* and $\varepsilon_{i,t}$, individual-specific deviations from the mean.

Following Metzker and Bohm (2015) I consider economy consisting of two sectors, the financial sector *F* and the Real sector *R*. Thus, *generic attribute premium*, *P,* in Finance at the time *t* can be presented as follows:

$$P_t = (c_{i,t,F} - c_{i,t,R}) + (s_{i,t,F} - s_{i,t,R}) + (\varepsilon_{i,t,F} - \varepsilon_{i,t,R}) \quad (3)$$

Metzker and Bohm (2015) find that the cognitive and non-cognitive difference between workers in finance and non-finance industry has stayed similar throughout the time. I assume that this finding is generalizable also on executives. Taken that, differences in *other executive generic attributes* are consisting solely on cognitive and non-cognitive differences, C, we can derive the *generic attribute premium* in Finance as follows:

$$\hat{P}_t = C + \hat{s}_{t,F} - \hat{s}_{t,R} \quad (4)$$

Further, taken that executive connectedness, *s,* can be a source of value through its quantity or quality, I can derive four distinctive ways the executive connectedness can be an explanatory factor for the *finance wage premium:*

H-1: *Average pay for connectedness* is greater in the financial sector relative to the average pay for connectedness in the non-finance sector:

$$W_a = C + \hat{s}_t + \hat{s}_t \bullet F > C + \hat{s}_t \quad (5)$$

Where W_a describes the compensation on *executive generic attributes, F* stands for the financial sector, $\hat{s}_t$ average pay for connectedness and $\hat{s}_t \bullet F$ the interaction between connectedness and working in finance sector

H-2: *Average pay for connectedness increases over time* in the financial sector relative to average pay for connectedness in the non-finance sector

$$\frac{F_{t+1}}{F_t} > 1 \quad (6)$$

H-3: *Average connectedness is greater* in the financial sector relative to average connectedness in the non-finance sector

$$\hat{s}_{t,F} > \hat{s}_{t,R} \quad (7)$$

H-4: *Average connectedness increases over time* in the financial sector relative to average connectedness in the non-finance sector

$$(\hat{s}_{t+1,F} - \hat{s}_{t+1,R)} > (\hat{s}_{t,F} - \hat{s}_{t,R}) \quad (8)$$

Appendix B: Summary Statistics

This table provides the summary statistics on variables used in my empirical analyses. Panels A and B presents the statistics on general and within-industry connectedness measures for executives s. Panel C provides statistics on compensation variables and Panel D on the other firm and industry characteristics that we use in the empirical analysis. Definitions of all variables are provided in Appendix C

Panel A: Connectedness Measures	N	Mean	Median	Std Dev
Overall Connections (Unscaled)	121 647	91.542	37.000	145.862
Overall Connectedness	121 647	1.069	0.428	1.523
Industry Connections (Unscaled)	127 320	20.530	14.000	20.524
Industry Connectedness	127 320	32.822	17.497	46.790
Out-of-industry Connections (Unscaled)	75 346	110.165	51.000	138.845
Out-of-industry Connectedness	75 346	1.270	0.586	1.617
Panel B: Compensation Variables				
Salary	144 630	438.776	372.692	247.683
Ln (Salary)	144 630	5.937	5.921	0.551
Bonus	69 883	445.513	513.966	3428.022
Ln (Bonus)	69 883	5.314	5.380	1.374
TDC1	133 557	2414.943	1392.248	2888.691
Ln (TDC1)	133 557	7.297	7.239	0.971
Panel C: Other Executive, Firm and Industry characteristics				
1-year return	135 853	15.623	11.692	35.418
Prior two year returns	141 409	12.158	10.657	23.000
Mkt-to-book	135 069	6.758	2.265	320.040
Tangible_Assets	147 120	0.236	0.159	0.230
Total_Assets	147 120	17265.594	2142.527	95756.263
Ln (Total Assets)	147 120	7.807	7.669	1.748
PIB	147 124	0.354	0.000	0.478
Duality	147 124	0.538	1.000	0.499
Independent directors	147 124	0.754	0.786	0.150
Coopted	147 124	0.202	0.000	0.402
Overlap	147 124	0.208	0.125	0.240
Tobin's Q $_{t+1}$	139 025	1.266	0.913	1.289
R&D	60 587	0.064	0.041	0.075
MA-Score	86 820	-0.001	-0.0269	0.134
Age	107 131	52.836	53.000	7.733
Ln (Age)	107 131	3.957	3.970	0.147

Appendix C: Definitions

Variable	Source	Definition
Connectedness		
General Connectedness	BoardEx	Number of all Executive connections based on education, employment or social activities, divided by the total number of executives and directors and multiplied by 1 000
Industry Connectedness	BoardEx	Number of CEO connections within two-digit SIC industry based on education, employment or social activities, divided by the total number of executives and directors and multiplied by 1 000
Connectedness	BoardEx	Sum of General and Industry Connections
Relative network	BoardEx	Average size of Finance executives network divided by average size of the Non-Finance executives network
Non-Finance	BoardEx, Bureau of Financial Analysis	Employee working outside of the Finance Sector (NAICS code: 52)
Compesation Variables		
Cash Compensation	ExecuComp	Sum of salary and bonus
Option Grants	ExecuComp	Black-Scholes value of options granted in the current fiscal year
Restricted Stock Grants	ExecuComp	Value of restricted tok granted in the current fiscal year
TDC1	ExecuComp	Sum of salary, bonus, other annual compensation, long-term incentive
Wage premium	BoardEx, Bureau of Financial Analysis	Average wage per employee/executive in Finance divided by the average wage per employee/executive in Non-Finance
Other Firm and Executive Characteristics		
1-year return	ExecuComp	Annual percentage returns (dividends reinvested)
Prior two years return	ExecuComp	Two years cumulative returns (dividends reinvested)
Market-to-book	Compustat/CRSP	Market value of equity divided by the sum of book value of equity and
Total Assets	Compustat	Book value of total assets
Tangible_Assets	Compustat	Plant, property and equipment divided by total assets
PIB	BoardEx	Dummy variable that equals one if company has public Investment Board
Duality	BoardEx	Dummy variable that equals one if the CEO is at the same time chairman of the board
Independent directors	BoardEx	Number of independet directors divided by the total number of board members
Coopted	BoardEx	Proportion of board members that are appointed after the incumbent CEO
Revenue	Compustat	Annual revenue of the fiscal year
Overlap	BoardEx	Overlapping directors
Tobin's Q	Compustat	Sum of book debt and market value of equity divided by total of assets